REVUE SUISSE DE ZOOLOGIE 109 (3): 511-518; septembre 2002

Two new species of *Systole* Walker (Hymenoptera: Eurytomidae) from Bulgaria

Anelia STOJANOVA
Department of Zoology, University of Plovdiv, 24 Tsar Assen Str., Plovdiv 4000,
Bulgaria, e-mail: stanelia@pu.acad.bg

Two new species of *Systole* Walker (Hymenoptera: Eurytomidae) from Bulgaria. - Two new species *Systole marinazerovae* and *Systole besaparica* are described and illustrated on the basis of specimens from Bulgaria. Specimens were collected by sweeping in the Rhodope Mountains, where the species occur up to 2200 m altitude.

Key-words: Hymenoptera - Eurytomidae - *Systole* - taxonomy - Bulgaria.

INTRODUCTION

Systole is an exclusively phytophagous genus of the predominantly parasitic family Eurytomidae. The larvae of *Systole* are seed-feeders associated with Apiaceae and Lamiaceae. Some species may cause serious damage on cultivated plants (Bouček, 1952; Nikolskaya, 1956; Claridge, 1959; Zerova & Seregina, 1994).

Zerova (1978) separated two subgenera on the basis of morphological and biological differences: *Systole* s. str., associated with Apiaceae, and *Trichosystole*, associated with Lamiaceae.

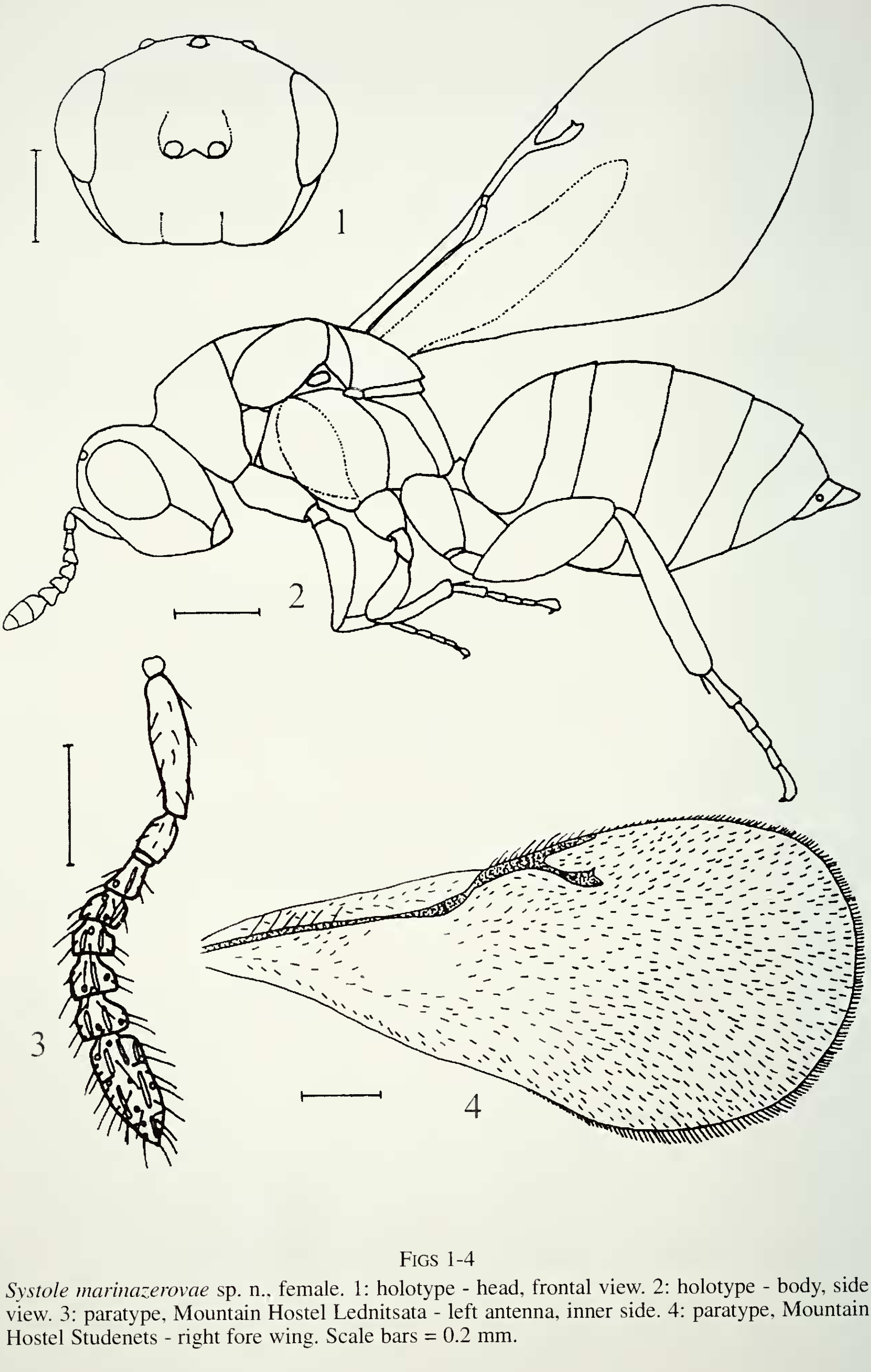
The genus *Systole* was revised for the Palaearctic Region by Zerova (1995), who recognized 20 valid species. Most species occur in the Palaearctic Region, as well as in the Oriental Region (Narendran, 1994) and the Nearctics (Peck, 1963).

Systole marinazerovae sp. n. Figs 1-4

MATERIAL EXAMINED

Holotype: female, Bulgaria: the Rhodope Mts., Lednitsata Mountain Hostel - 1700 m a. s. l., 41° 39' 6.4" N, 24° 30' 57.1" E, 20.VII.2001. Paratypes: 2 females, the Rhodope Mts., Studenets Mountain Hostel - 1700 m, 41° 38' 28.3" N, 24° 41' 31.6" E, 18.VII.2001; 4 females, the Rhodope Mts., Snezhanka Peak - 1925 m, 41° 38' 26.9" N, 24° 40' 48.4" E, 18.VII.2001; 2 females, the Rhodope Mts., Perelik Mountain Hostel - 1960 m, 41° 36' 41.8" N, 24° 41' 24.9" E, 19.VII.2001; 1 female, the Rhodope Mts., Goljam Perelik Peak - 2191 m, 41° 36' 9.7" N, 24° 34' 36.6" E, 19.VII.2001; 5 females, the Rhodope Mts., Lednitsata Mountain Hostel, 19.VII.2001; 6 females, (same locality), 20.VII.2001; 1 female, the Rhodope Mts., Gela Village - 1400 m, 41° 39' 6.4" N, 24° 34' 1.5" E, 20.VII.2001. Holotype and four paratypes are deposited in the collection of Muséum d'histoire naturelle, Geneva. Eleven paratypes are deposited in the collection of Department of Zoology, University of Plovdiv. Five paratypes are deposited in the collection of Institute of Zoology, Ukrainian Academy of Sciences (Kiev).

Manuscript accepted 10.04.2002



FIGS 1-4

Systole marinazerovae sp. n., female. 1: holotype - head, frontal view. 2: holotype - body, side view. 3: paratype, Mountain Hostel Lednitsata - left antenna, inner side. 4: paratype, Mountain Hostel Studenets - right fore wing. Scale bars = 0.2 mm.

DIAGNOSIS

The following combination of features differentiates *Systole marinazerovae* sp. n. from other species of the genus: 1. Body brownish black with yellow spots on the face, bright antennae and legs; 2. Anterior margin of clypeus straight; 3. Funicular segments two to five distinctly transverse; 4. Marginal vein slightly longer than stigmal vein, postmarginal vein is the shortest; 5. Gaster as long as mesosoma and head together.

DESCRIPTION

Holotype female: body brownish black; antennal scape yellow with dorsal brown stripe; pedicel (except yellow apex) and flagellum yellowish brown; clypeus and lower parts of face to malar sulcus honey yellow; mandibles yellow with apices brown; pronotum with a pair of small yellow spots on its anterior surface, hidden by head; fore and mid coxae yellowish brown with apices and inner surface yellow, hind coxae yellowish brown; fore and mid femorae yellow with brown tint, hind femora (except apices yellow) yellowish brown; tibiae and tarsale segments one to four yellow, the fifth brown; ovipositor sheaths yellow; wings hyaline, veins dark yellow; body pubescence silvery white.

Head (Figs 1, 2) with reticulate shining surface, clypeus smooth, pubescence consisting of sparsely scattered hairs. In frontal view head transverse, elliptic, about 1.3x as wide as high; in dorsal view slightly wider than thorax, about twice as wide as long. Frons moderately convex, face slightly protruding medially; anterior margin of clypeus straight; scrobal depression shallow, not reaching median ocellus; toruli situated halfway between front ocellus and clypeal margin; eye height about 1.5x malar space; POL about 2.1x OOL; eyes with sparse hairs; malar sulcus distinct. Antenna (Fig. 3) with scape cylindrical, only slightly expanded medially, length about 4x as the maximum width; pedicel about one fourth the length of the scape; first funicular segment narrowed basally with length about twice as basal width; funicular segments two to five distinctly transverse; clava slightly wider than the last funicular segment; clava and funicle clothed with not very long hairs.

Mesosoma (Fig. 2) with dorsal surface reticulate, shining, with sparsely shallow punctures, pubescence consisting of scattered projecting hairs. Mesosoma short, about 1.5x as long as the maximum width in lateral view; pronotum transverse, width 1.6x its median length including neck. Mesoscutum about twice as wide as long, with notauli complete, moderately deep. Scutellum little wider than long, posterior margin with a carina and a row of pits. Propodeum strongly inclined, sloping at a steep angel of about 100° relative to the dorsal surface of the rest of the mesosoma; sculpture reticulate, with irregular cells laterally and traces of median furrow; callus with long hairs. Fore wing (Fig. 4) with marginal vein slightly longer than stigmal vein; postmarginal vein shorter than stigmal vein; speculum present.

Gaster (Fig. 2) shining with faint alutaceus sculpture and scattered hairs on tergum six. Gaster as long as mesosoma and head together; petiole short, about 3x as wide as long, with small teeth laterally; first tergum about twice as long as the second; terga three to six of equal length and slightly longer than second tergum. Ovipositor sheaths directed posteriorly, not tilted upwards.

Length 2.1 mm.

VARIATION

The variation of paratypes involves the size, brightness and extent of yellow markings, and pubescence. Most of paratypes have coloration as the holotype, but one paratype from Snezhanka Peak and that from Gela Village have more extensive and lighter yellow markings on face, pronotum and legs. Paratypes from Lednitsata Mountain Hostel have pubescence as the holotype, but the rest of paratypes are almost glabrous. Length 1.8 – 2.2 mm.

ETYMOLOGY

The new species is named in honour of the well-known chalcidologist Dr Marina Zerova.

Systole besaparica sp. n. Figs 5-8

MATERIAL EXAMINED

Holotype: female, Bulgaria: the Rhodope Mts., Besapari hills: 2 km SW Novo selo Village – 350 m a. s. l., 42° 6' 13" N, 24° 27' 46.7" E, 18.VI.2000. Paratypes: 5 females, the Rhodope Mts., Bjala Cherkva Mountain Hostel – 1650 m, 41° 56' 5.5" N, 24° 40' 29.5" E, 26.VI.1996; 7 females, the Rhodope Mts., Zagrazhden Village – 1000 m, 41° 44' 27.9" N, 24° 58' 54.2" E, 4.VII.1996; 5 females, the Rhodope Mts., Zagrazhden Village, 5.VII.1996; 7 females, the Rhodope Mts.: Planinsko Village – 1200 m, 41° 45' 36.1" N, 24° 57' 36.8" E, 4.VII.1997; 5 females, the Rhodope Mts., Besapari hills: 2 km SW Novo selo Village, 18.VI.2000; 1 female, the Rhodope Mts., (same locality), 1.VII.2000; 1 female, the Rhodope Mts., Malko Gradishte Village – 300 m, 41° 45' 56.7" N, 25° 59' 55.6" E, 27.VI.2001. Holotype and four paratypes are deposited in the collection of Muséum d'histoire naturelle, Geneva. Twenty-one paratypes are deposited in the collection of Department of Zoology, University of Plovdiv. Five paratypes are deposited in the collection of Institute of Zoology, Ukrainian Academy of Sciences (Kiev).

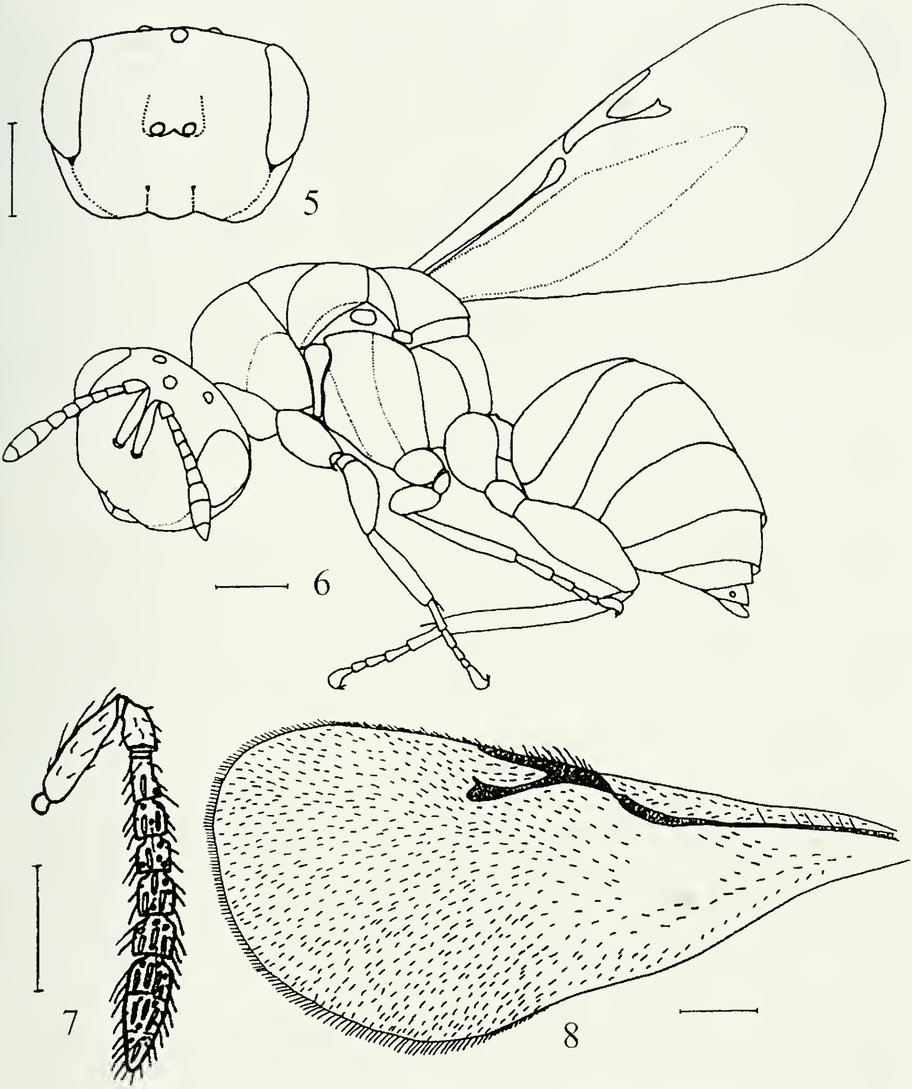
DIAGNOSIS

The following combination of features differentiates *Systole besaparica* sp. n. from other species of the genus: 1. Gaster dark brown with coppery tints, face with dark yellowish brown spots; 2. Anterior margin of clypeus slightly arched; 3. Funicular segments two to four quadrate, the fifth is slightly transverse; 4. Marginal vein slightly shorter than postmarginal vein, which is slightly shorter than stigmal vein; 5. Petiole about 1.5 x as wide as long dorsally; 6. Gaster as long as mesosoma.

DESCRIPTION

Holotype female: head and mesosoma black, gaster dark brown with coppery tints; antennae pale brown, scape with lighter stripe ventrally; anterior clypeal margin and lower areas of face lateral to clypeus dark yellowish brown; pronotum anteriorly with a pair of small yellow spots, hidden by head; coxae brown; fore and mid coxae with lighter apices; fore and mid femorae yellow with brown markings medially, hind femorae except for yellow tips brown; tibiae and tarsal segments one to four yellow, the fifth brown; wings hyaline, veins brown; pubescence silvery white.

Head (Figs 5, 6) with reticulate surface sculpture, clypeus smooth; face slightly protruding medially with slight and faint radiating striae; genae almost without sculpture, with polished pit at lower eye margin; pubescence moderately dense.



FIGS 5-8

Systole besaparica sp. n., female. 5: holotype, head, frontal view. 6: holotype, body, side view. 7: paratype, Besapari hills: 2 km SW Novo selo Village, left antenna, inner side. 8: paratype, Besapari hills: 2 km SW Novo selo Village, left fore wing. Scale bars = 0.2 mm.

Head in frontal view slightly transverse, about 1,3x as wide as high; in dorsal view slightly wider than thorax, about twice as wide as long. Frons moderately convex; anterior margin of clypeus slightly arched, tentorial pits well-defined; genae widened laterally, malar sulcus faint. Scrobal depression shallow, not reaching median ocellus; toruli situated halfway between median ocellus and clypeal margin. Eye height slightly longer than malar space; POL about 3x OOL; eyes with sparse hairs. Antennal scape (Fig. 7) cylindrical, only slightly expanded medially, with about 4x as long as wide; pedicel about one fourth of scape length; first funicular segment narrowed basally, about 2.3x as long as the basal width; funicular segments two to four quadrate, the fifth is slightly transverse; clava as wide as last funicular segment; clava and funicle clothed with moderately long hairs.

Mesosoma (Fig. 6) with dorsal surface reticulate and sparsely and shiny punctured, pubescence consisting of scattered adpressed hairs. Mesosoma short, about 1.5x as long as the maximum width in lateral view; pronotum transverse, width in dorsal view 1.7x its median length including neck. Mesoscutum about 1.6x as wide as the median length. Scutellum about as wide as long, posterior margin with a carina and a row of pits. Propodeum strongly inclined, in profile sloping at almoust 100° to the plane of the rest of the mesosoma; with median area reticulate sculptured, irregular cells laterally and traces of median furrow; callus with long hairs. Fore wing (Fig. 8) with marginal vein slightly shorter than postmarginal vein, which is slightly shorter than stigmal vein; speculum present.

Gaster (Fig. 6) short, about as long as mesosoma, smooth and shining, with finely alutaceous sculpture on last two segments and scattered hairs on segments five to seven. Petiole with reticulate sculpture, about 1.5x as wide as long dorsally, with two teeth laterally; gastral terga one, three and four subequal in length and longer than the other terga; the second and fifth slightly shorter; the sixth is only about one third as long as the fifth; the seventh is slightly longer than the sixth. Ovipositor sheaths directed.

Length 2.3 mm.

VARIATION

The variation of paratypes involves the brightness of yellowish brown markings on the face and coppery tint of the gaster. Paratypes from Bjala Cherkva Mountain Hostel, Zagrazhden Village and Planinsko Village have more distinct markings on the face and tints of the gaster compared with the rest of the paratypes. Length 1.8 – 2.4 mm.

ETYMOLOGY

The name of the new species is derived from the geographic name of locality of the holotype.

DISCUSSION

S. marinazerovae sp. n. is closely related to *S. albipennis* Walker regarding the following structural respects: shape of funicular segments two to five distinctly transverse; shape of anterior margin of clypeus straight; mesosoma short, with propodeum sharply declined; propodeum with traces of a median furrow; wing venation with marginal vein the longest; length of petiole about 3x as wide as long. *S. marinazerovae* sp. n. and *S. albipennis* have different coloration: *albipennis* is predominantly black with fuscous antennae and rufo-testeceous markings on the legs. *S. marinazerovae* sp.n. has brownish black body, yellow spots on the face, and bright antennae and legs. There are some more differences between both species: *S. albipennis* has distinctly transverse head with widened genae in frontal view; the head of *S. marinazerovae* sp. n. is transverse too, but the genae are not widened, so that the head seems somewhat elliptic; the gaster of *S. albipennis* is short, as long as mesosoma, whereas that of *S. marinazerovae* sp. n. is as long as mesosoma and head together.

On the other hand *S. marinazerovae* sp. n. is related to *S. tuonela* Claridge (after the original description of Claridge, 1959) regarding the shape of head in frontal view, distinctly transverse funicular segments two to five, and short mesosoma. *S. marinazerovae* sp. n. differs from *S. tuonela* in coloration (*S. tuonela* is black with pale markings on the legs), in having marginal vein longer than stigmal vein (in *S. tuonela* marginal vein is shorter than stigmal vein), and in having gaster as long as mesosoma and head together (the gaster of *S. tuonela* is equally as mesosoma).

S. besaparica sp. n. resembles *S. albipennis* in having: shape of the face in frontal view with genae widened laterally, short mesosoma with propodeum sharply declined, propodeum with traces of median furrow, and gaster as long as mesosoma. However, *S. besaparica* sp. n. differs in coloration: *S. albipennis* is black with rufo-testaceous markings on legs and fuscous antennae, whereas *S. besapaica* sp. n. has black head and mesosoma, gaster dark brown with coppery tints, dark yellowish brown spots on the face, pale brown antennae and yellow markings on the legs. *S. besaparica* sp. n. and *S. albipennis* differs each other through the shape of the anterior margin of clypeus (*S. besaparica* sp. n. has slightly arched margin of clypeus; the clypeus of *S. albipennis* is with straight margin), the shape of funicular segments (*S. besaparica* sp. n. has funicular segments two to four quadrate, the fifth is slightly transverse; the funicular segments two to five of *S. albipennis* are distinctly transverse), the wing venation (*S. besaparica* sp. n. has marginal vein slightly shorter than postmarginal vein, which is slightly shorter than stigmal vein; the marginal vein of *S. albipennis* is slightly longer than stigmal vein, postmarginal vein is shorter than stigmal vein), and the length of petiole (*S. besaparica* sp. n. has the petiole about 1.5x as wide as long dorsally, while the petiole of *S. albipennis* is about 3x as wide as long).

The taxonomic position of the two new species in the subgenera of *Systole* is not quite clear. The peculiarities of dorsal sculpture give grounds *S. marinazerovae* sp. n. (with shining, finely reticulate sculpture) to be joined to the subgenus *Systole* and *S. besaparica* sp. n. (with slightly shining, rougher reticulate sculpture) - to the subgenus *Trichosystole*. Perhaps some data about the hosts of both new species in the future could throw light upon that problem.

ACKNOWLEDGEMENTS

I due my gratitude to Dr Marina Zerova (Ukrainian Institute of Zoology, Kiev) for her support and for her valuable help with my study on the new species.

REFERENCES

Bouček, Z. 1952. A new pest of the Cummin, *Systole albipennis* Walk. (Eurytomidae, Chalcidoidea, Hymenoptera*). Zoologické a entomologické listy, Brno* 15 (1): 4-9 (in Czech with Russian and English summaries).

CLARIDGE, M. 1959. Notes on the genus *Systole* Walker, including a previously undescribed species (Hymenoptera, Eurytomidae). *Entomologist's Monthly Magazine* 95: 38-43.

NARENDRAN, T. 1994. Torymidae and Eurytomidae of Indian subcontinent (Hymenoptera: Chalcidoidea). *Privately published, Kerala*, 500 pp.

NIKOLSKAYA, M. 1956. Seed-eating chalcids of the USSR and the importance of the phytophagous habits in the evolution of the group (Hymenoptera, Chalcidoidea). *Revue d'Entomologie de l'USSR* 35 (3): 570-581 (in Russian with English summary).

PECK, O. 1963. A catalogue of the Nearctic Chalcidoidea (Insecta; Hymenoptera). *Canadian Entomologist (Supplement)* 30: 1-1092.

ZEROVA, M. 1978. Fauna Ukraine. Eurytomidae. Vol. 11 (9). *Naukova Dumka, Kiev*, 465 pp. (in Ukrainian).

ZEROVA, M. 1995. Parasitic Hymenoptera – Eurytominae and Eudecatominae of Palaearctics. *Naukova Dumka, Kiev*, 460 pp. (in Russian).

ZEROVA, M. & SEREGINA, L. 1994. The seed-feeding Chalcidoidea of Palaearctics. *Naukova Dumka, Kiev*, 235 pp. (in Russian).